ENGINEERING

Collision Tracking and Brain Mapping

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According to the Mayo Clinic, repeated head traumas may lead to a neurodegenerative condition known as chronic traumatic encephalopathy (CTE). Recently, postmortem analysis has shown that American football players have a high occurrence of CTE. An analysis of the effect of collisions between different players during a football game will provide data that further contributes to the understanding of player interactions and the effect this has on the brain.

To investigate theses collisions, our research team attached accelerometers behind players' ears during a football game. The sensors would mark any head impacts above a set threshold. The data was then compiled to sort different collisions by player position, play type, formation, and the outcome of the play. The Purdue Neurotrauma Group gathered magnetic resonance image data from the study participants before and after football seasons to evaluate the effects of impacts with different frequencies and magnitudes that a full season of play has on the health of the brain.

The compilation of this data will allow our research group to form conclusions about how different player behaviors lead to an increase or a decrease in head impacts. Our research group also hopes that these same techniques can be implemented on a wider scale to analyze impacts throughout high levels of play and hopefully professional leagues. The vision of this research is to improve the safety of contact sports and preserve the health of players.

Research advisor Taylor Lee writes: "Carl Russell was an integral part of the research team. He meticulously analyzed video that will provide important game information about the conditions under which the head impacts were sustained. This will be used to better understand ways to help reduce the severity of head impacts sustained by contact sport athletes."

Helmets used by the Purdue Neurotrauma Group for various experiments including the implementation of novel sensors.

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